3.0 Affected Environment and Environmental Consequences

3.1 Fish and Wildlife

3.1.1 Affected Environment

Many species of birds, fish, and mammals are found in the project area, including large mammals such as elk, moose, mountain goats, whitetail and mule deer, black bear, and mountain lion. Many nongame species are also in the area and include a variety of songbirds, weasel, mink, beaver, otter, flying squirrel and porcupines (USFS, 1987). Varied habitats can be found for the diverse mix of animals. Some **threatened** and **endangered** animals may also exist in the vicinity of the proposed project (see Section 3.1.3).

The Kootenai River aquatic ecosystem has been degraded due to wetland loss and impoundment during the last century (see Section 1.2 and the Kootenai River Subbasin Plan, [KTOI and MFWP, 2004]). Nutrients levels have decreased, and have adversely affected the populations of fish and invertebrates in the river. Lower nutrients causes a reduction in food production, which <u>could</u> be a major contributor to poor fish production over the past two decades (Stockner, 2003).

3.1.2 Impacts of the Proposed Action

Adding nutrients in the river system is expected to stimulate algae growth, which aquatic insects feed on. Fish then feed on the aquatic insects and would, if successful, help rehabilitate the post-development Kootenai River ecosystem and reverse declining trends in native populations of kokanee, burbot, interior redband trout, and ESA-listed populations of bull trout and white sturgeon (see Section 3.1.3). Success of the project would be determined through extensive monitoring for all levels of the ecosystem including algae, aquatic insects and fish. There are other projects in the Kootenai River Subbasin whose purposes are to benefit fish populations (see Section 1.4). If these projects, in concert with this project, are successful, some fish populations that have declined would begin to return to previous levels.

Possible negative effects of the proposed action to the existing fish communities in the upper Kootenai could include a higher proportion of biomass in non-game fish (such as large-scale suckers). Nongame fish could increase to levels that may affect salmonid production (or other sensitive species such as Kootenai River white sturgeon). Management criteria for nutrient additions have been set up to try toand safeguard against any long-term deleterious effects of the treatments (see Section 2.1.6 and Table 1). In other words, if negative effects are discovered during monitoring, then project managers would ask IKERT to re-evaluate and suspend the project if necessary.

Animals may be disturbed by temporary construction noise and human activity in the area. Animals would likely move to other areas during and after construction and treatment where similar habitat is available nearby.

3.1.3 Threatened and Endangered Species

The U.S. Fish and Wildlife Service identified federally-listed species that may occur in the project area (USFWS, October 21, 2004). See Table 4.

Species Expected Category Occurrence Kootenai River White Sturgeon (Acipenser Endangered Transient transmontanus) Migratory/Resident Bull trout (Salvelinus confluentus) **Threatened** Bald eagle (Haliaeetus leucocephalus) **Threatened** Resident/Transient Grizzly bear (Ursus arctos horribilis) **Threatened** Resident/Transient Gray wolf (Canis lupus) Endangered Resident/Transient Canada lynx (Felis lynx canadensis) **Threatened** Resident/ Transient Ute ladies'-tresses (Spiranthes diluvialis) Threatened Resident Critical habitat for Kootenai white sturgeon Designated

Table 4 ESA-Listed Species in Project Area

Kootenai River White Sturgeon

Source: US Fish and Wildlife Service, October 21, 2004.

Kootenai River white sturgeon are a "distinct population segment" that can occupy the Kootenai River from Kootenai Falls, Montana (50 rkm downstream of Libby Dam) downstream to the outflow of Kootenay Lake at Corra Linn Dam, British Columbia. This distinct population is one of 18 landlocked populations in the Pacific Northwest (USFWS 1999).

Juvenile or adult white sturgeon sightings in the project area are rare and unsubstantiated. An angler reported catching a 50cm sturgeon somewhere between Bonners Ferry and the Yaak River in Montana in 1981 (Partridge 1983). Some additional historic sightings have been reported, but few are verifiable. No other white sturgeon have been documented near Leonia (Paragamian, January 2, 2005).

Effects of the Proposed Action on White Sturgeon

Kootenai River white sturgeon are uncommon within the habitat of the project area. Increases in river productivity may lead to increased food supplies which may then increase survival, growth rates, and body condition of larvae, juveniles, and adults in downstream reaches where they currently reside. The Proposed Action may greatly improve food resources and survival of early life stages as seen in other studies of nutrient restoration (Larkin et al., 1999; Wilson et al. 1999a).

It is difficult to speculate the pathway of nutrients and how specific fisheries would be affected in the long term and predict the outcome. However, several considerations should be taken into account as to possible indirect effects on early life history functions and survival to Kootenai River white sturgeon. Although the Proposed Action would presumably increase larval survival through the critical transition from yolk sac to feeding in the open environment, consideration of predation on eggs should be taken into account if non-game, egg-preying species increase. One primary concern that has been considered is the direct increase of predators such as large-scale suckers and northern pikeminnow on Kootenai River white sturgeon eggs. However, there is no conclusive evidence that egg predation is a limiting factor or that it could be. In addition, there is no information available to suggest that food production is a limiting factor for sucker recruitment and density. On the other hand, white sturgeon adults are a top predator and could use the increased biomass of the aforementioned non-sport fish as forage. In relation to sight feeding predation on eggs, increased food production may reduce water visibility in the reach below the study zone, which may in turn reduce sight feeding predation of all early life stages of sturgeon.

Bull Trout

Columbia River populations were listed as a threatened species on July 10, 1998. Although recently proposed, no critical habitat has been designated for bull trout in the Kootenai drainage.

The Kootenai River is known to have at least one migratory population of bull trout consisting of **fluvial** fish (Walters and Downs 2001; Walters 2002). In the Kootenai River in Idaho, bull trout usually start upstream migrations during June and July (IDFG unpublished data).

Bull trout densities in the Kootenai River mainstem appear low, based on electrofishing catch rates (<1 bull trout/h) and angler catch rates (<0.05 fish/h), but appear distributed throughout the Kootenai River in Idaho (Walters 2002, 2003; Hardy 2003; IDFG unpublished data). In addition, adult fish are known to migrate through the treatment area enroute to O'Brien Creek. The Boulder Creek tributary, which enters the Kootenai River just downstream of the treatment site, historically served as a bull trout spawning area. Bull trout **redd** surveys have been conducted on Boulder Creek from 2000-2004, with two redds found both in 2001 and 2002 (Walters 2003, 2004).

Effects of the Proposed Action on Bull Trout

If an individual bull trout were in the immediate vicinity of the nutrient outflow pipe, it could be displaced slightly for the duration of the treatment. However, no adverse effects on spawning migrations are likely. In addition, treatment dilutions are well within safe water consumption standards (human) within 2m of the pipe (human standards are more conservative than for aquatic organisms). Because tanks are located on the rim away from the river's edge, and an emergency alarm and shut-off valves would be in place, no spills directly into the Kootenai River are anticipated.

Indirect effects on bull trout may include increased biomass, length at age, and fecundity as a result of increased nutrient levels. Other studies of nutrient restoration programs have clearly shown these anticipated benefits to fish populations (Peterson, et al. 1993; Wilson, et al. 1999b). No loss of habitat for bull trout would occur from this project. No potential take exists for bull trout.

Bald Eagle

Bald eagles are both yearlong residents and winter visitors in northern Idaho. Bald eagles nest almost exclusively in live trees usually within one mile in line of sight of a large river or lake. The most typical nesting trees include Ponderosa pine, Douglas fir, western larch, and cottonwood. Winter habitat is generally associated with areas of open water where fish and waterfowl congregate (Stalmaster, 1987). Bald eagles use perches during the day while hunting, feeding, or resting; roosts are used at night or for protection during bad weather and may be occupied by one to several hundred bad eagles; roost sites, like nest sites, are used year after year.

The bald eagle is an opportunistic predator and feeds primarily on fish, but also consumes a variety of birds and mammals (both dead and alive) when fish are scarce or these other species are readily available (USFWS 1997).

An active nest is present just upstream of the treatment site (approximately 2 km). Two adults have been seen in the area from the nesting site to below Boulder Creek. In addition, there are two alternate nesting sites downriver near Caboose Creek. One nest sits on the river's edge in a Ponderosa pine, while the other is located up on the rim at approximately 2000 ft elevation (Robinson, November 22, 2004).

Effects of the Proposed Action on Bald Eagles

Impacts to bald eagles would include temporary yet minor increases in noise and human disturbance associated with construction of treatment site and delivery of nutrients and personnel in the area. Nutrient holding tanks will only need to be replenished 2-4 times during the treatment period. The activity in the area is not likely to additionally displace bald eagles from the project area during the treatment process. Motorized vehicle use will be limited to <u>project</u> personnel. The treatment site is on private property and lies between the highway and canyon rim so traffic and human presence already exist. The only known nest is about 2 km upstream of the proposed location and it is unlikely that the planned roadwork would affect this nest. A survey of the surrounding area for any other nests will be done prior to any road improvements or any other activity that would create noise or other disturbance.

No impacts to bald eagles are anticipated as a result from consumption of fish and/or water near the treatment site and no loss of habitat or nesting sites is anticipated. Nitrate levels of treatment water fall within what is considered "safe" for consumption within 2 m of the pipe opening. The nutrient additions could benefit eagles by increasing fish abundance, biomass and the biological condition of the river.

Bald eagles lay eggs from February to April. Treatment would begin in late June after the breeding season. Fledglings should be nearly independent by this time. No nesting sites would be removed or tampered with. The nest site well upstream of the treatment location would not be adversely affected. The eagles may avoid the area on the canyon rim where the nutrient application station would be housed and the minor increase in traffic would occur. This site is far enough away from the river that foraging should not be impacted.

Grizzly Bears

On July 28, 1975, the grizzly bear was officially protected under the **Endangered Species Act** and was listed as threatened throughout its entire range in the lower 48 states (U.S. Department of the Interior, 1975). Between 1800 and 1975, grizzly bear populations in the lower 48 states decreased from more than 50,000 to fewer than 1,000 bears. The main causes for this decline are attributed to habitat loss (settling of the West), over-hunting and commercial trapping, livestock depredation controls, and fear-caused hunting by humans. Today, the main threat to grizzly bears is from habitat degradation due to development and other human disturbances (U.S. Department of the Interior, 1995).

Grizzly bears maintain large home ranges that vary depending on gender and food abundance. They are generalists when it comes to habitat. They occupy low-elevation **riparian** areas, snow chutes, and meadows in the spring and late fall, and move up to higher sub-alpine forests in the summer, early fall, and winter. Grizzlies usually den above 6,000 ft in natural or excavated caves after the first snowfall (U.S. Department of Agriculture, 2002).

There are no known credible sightings of grizzly bears within 5 km of the project area from 1960-2003, nor were there any reports of collared bears from 1980-2003. On May 20, 2004 a credible sighting was reported near Boulder Creek on the opposite side of the river from the treatment site (Kasworm, December 3, 2004; Wakkinen, December 3, 2004).

The project area lies near the Cabinet/Yaak Grizzly Bear Recovery Zone. The treatment site and tank location itself would not be in recovery zone, however the access road would be (Figure 8).

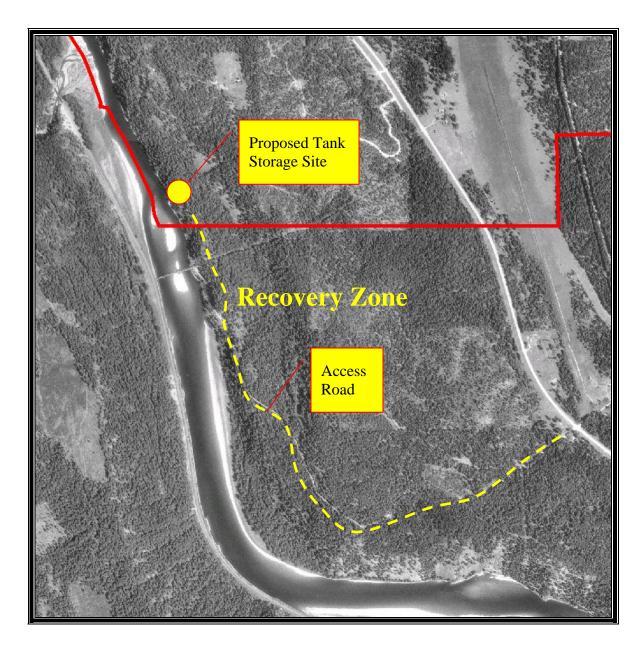


Figure 8 The Cabinet/Yaak Grizzly Bear Recovery Zone

Effects of the Proposed Action on Grizzly Bears

Impacts to grizzly bears would likely include temporary yet minor increases in noise and human disturbance associated with construction of treatment site and delivery of nutrients and personnel in the area. Nutrient holding tanks would only need to be replenished 2-4 times during the treatment period. Motorized vehicle use will be limited to <u>project</u> personnel only. The treatment site is on private property and lies between the highway and canyon rim so traffic and human presence already exist.

No loss of habitat for food, denning, or migration is anticipated. In addition, no impacts to grizzly bears are anticipated as a result of consumption of fish and/or water

near the treatment site. Nitrate levels of treatment water fall within what is considered safe for consumption within 2 m of the pipe opening on the river bottom.

Gray Wolf

Gray wolves were protected under the Endangered Species Act in 1978. Having been extirpated from the western United States by the 1930s, wolves were listed as endangered throughout the lower 48 United States, except Minnesota where they were listed as threatened (U.S. Department of the Interior, 1978). Gray wolves have also been listed as experimental populations in other areas, including parts of Idaho and Montana. This designation has not been changed.

Wolves can live in many types of habitats including forested areas, rangelands, agricultural areas, deserts, and tundra. They are territorial in most areas, defending territories that range from 48 to 350 square miles (Mech, 1970; Peterson, 1977; Laudon, 2005). Two factors identified as crucial for establishing good wolf habitat include a large prey base and minimal human disturbance.

The gray wolf <u>is</u> listed as an <u>endangered</u> species north of Interstate 90 in Idaho. Key components of gray wolf conservation include prey availability and reducing human-caused mortalities.

The treatment area lies within the boundaries of the Northwest Montana Wolf Recovery Area which includes northwestern Montana and the Idaho Panhandle. There are currently no known wolf packs within a 20-mile radius of the treatment site. The nearest known pack location is the Candy Mountain pack in the Yaak Valley, just over 20 miles to the north. While there could be loners in the immediate project area, no sightings have been reported (Bangs and Laudon, December 13, 2004). Sightings have been reported in Boulder Meadows, approximately 10 miles to the west of the treatment site and on the opposite side of the Kootenai River (Laudon, December 13, 2004).

Effects of the Proposed Action on Gray Wolf

Impacts to gray wolves would likely include temporary yet minor increases in noise and human disturbance associated with construction of the treatment site and delivery of nutrients and personnel in the area. Nutrient holding tanks will only need to be replenished 2-4 times during the treatment period. Motorized vehicle use will be limited to <u>project</u> personnel only. The treatment site is on private property and lies between the highway and canyon rim so traffic and human presence already exist.

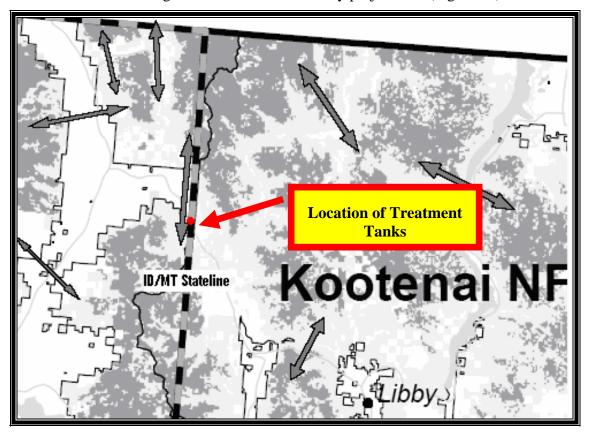
No loss of habitat for food, denning, or migration is anticipated. In addition, no impacts to wolves are anticipated as a result from consumption of fish and/or water near the treatment site. Nitrate levels of treatment water fall within what is considered safe for consumption within 2 m of the pipe opening on the river bottom.

Figure 9 The Candy Mountain Wolf Pack Home Range (This figure has been removed)

Canada Lynx

Lynx were listed as threatened, effective April 24, 2000.

Lynx habitat has been identified in the vicinity of the project area, though not at the treatment site itself. A linkage zone exists in the vicinity project area (Figure 10).



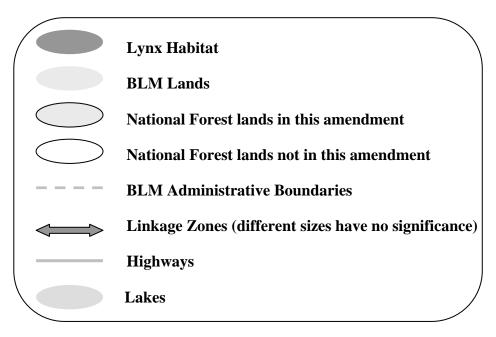


Figure 10 Canada Lynx Habitat and Linkage Zones

Effects of the Proposed Action on Canada Lynx

Impacts to Canada lynx would likely include temporary yet minor increases in noise and human disturbance associated with construction of the treatment site and delivery of nutrients and personnel in the area. Nutrient holding tanks will only need to be replenished 2-4 times during the treatment period. Motorized vehicle use will be limited to <u>project</u> personnel only. The treatment site is on private property and lies between the highway and canyon rim so traffic and human presence already exist.

No loss of habitat for food, denning, or migration is anticipated. In addition, no impacts to lynx are anticipated as a result from consumption of fish and/or water near the treatment site. Nitrate levels of treatment water fall within what is considered safe for consumption within 2 m of the pipe opening on the river bottom.

3.1.4 Species of Special Concern

Table 5 shows the Idaho species of concern in the vicinity of the project.

 Species
 Expected Occurrence

 Burbot (Iota Iota)
 Resident

 Redband rainbow trout (Oncorhynchus mykiss gairdneri)
 Migratory/Resident

 Westslope cutthroat trout (Oncorhynchus clarki lewisi)
 Resident

 Source: Idaho Conservation Data Center, March 18, 2005.

Table 5 Idaho Species of Concern

Burbot

In Idaho, burbot are endemic to the Kootenai River and are a species of special concern. They are imperiled because of large-scale hydro and habitat changes in the Kootenai River and the ecosystem including nutrient losses. Because of these factors it is very vulnerable to extinction within its very limited location.

There is only one instance of a burbot near the state border with Montana but none as far upstream as the state border. While burbot prefer slower moving water with sandy to small gravel substrate and lake environments, the river at the treatment site has a high gradient and large gravel substrate. Most sampling for burbot (Paragamian et al. 2000) was concentrated below rkm 244.5 due to a higher concentration of burbot but in 1993; some sampling was done up to the Montana border.

Effects of the Proposed Action on Burbot

The proposed action will take place prior to any spawning migrations for burbot in the lower river.

The Kootenai River is low in zooplankton density and any improvements to the primary and secondary productivity of the river below Bonners Ferry are likely to benefit burbot early life history, recruitment, and survival. This type of response was recently recorded in trout and mountain whitefish populations in Big Silver Creek, B.C. (Wilson et al 1999b). It is not known if nutrient restoration well above Bonners Ferry will show indirect benefits to burbot or other fish species in the lower river, however, it is very unlikely that there would be any associated negative effects.

Redband Rainbow Trout (Columbia River Redband Trout *Oncorhynchus mykiss gairdneri*)

A non-anadromous form of the Columbia River redband trout is native to the Kootenai (spelled Kootenay in Canada) River drainage upstream to at least Kootenai Falls in Montana (Allendorf, et al. 1980; Behnke, 1992). Columbia River redband trout (redband trout) spawn in Kootenai River tributaries from April to June, and include adfluvial runs from Kootenay Lake, British Columbia, and fluvial fish from the Kootenai River (Downs 1999; IDFG unpublished data). The juveniles rear in the tributary streams for up to three years before outmigrating to the Kootenai River, but some will outmigrate during their first summer (Downs, 1999, 2000; Walters and Downs, 2001; Walters, 2002, 2003). Redband trout in the Kootenai River are mainly insectivores, dependent on both aquatic and terrestrial insects.

Effects of the Proposed Action on Redband Trout

Redband trout are one of the species targeted to benefit from this nutrient restoration project. Redband trout could benefit if aquatic insect production increases after nutrient additions. The increased food supply could result in higher survival of juvenile redband trout that rear in the mainstem Kootenai River. An increased food supply could also support faster growth rates leading to an earlier age at maturity, and improved condition (e.g., relative weight), resulting in higher fecundities.

Westslope Cutthroat Trout (O. clarki lewisi)

Westslope cutthroat trout occur throughout the Kootenai River drainage, but are most common in tributary streams that are separated from the river by upstream migration barriers. Because redband trout are native to the Kootenai River, westslope cutthroat trout were likely never common in the mainstem or in tributaries downstream of migration barriers. Columbia River redband trout evidently replaced interior cutthroat trout in most areas where they came into contact (Behnke, 1992). During September electrofishing in 2000 and 2001, catch per unit effort for westslope cutthroat trout was only 1.1 fish/hr. An estimated 235 westslope cutthroat trout were harvested from the Kootenai River in 2001, with a catch per unit effort of 0.03 fish/angler h (Walters, 2003).

Little is known about westslope cutthroat trout in the Kootenai River, Idaho. All three life history forms are possible in the Kootenai River drainage, though resident forms in tributary streams appear most common. One westslope cutthroat trout was radio-

tagged on May 2, 2002 in the mainstem Kootenai River. This fish was located in Boulder Creek, a Kootenai River tributary, on June 4, 2002, where it presumably spawned (Walters, 2004). Westslope cutthroat trout likely use similar habitat as the redband trout in the mainstem, and their food habits are likely similar as well.

Effects of the Proposed Action on Westslope Cutthroat Trout

Westslope cutthroat trout could benefit if aquatic insect production increases after nutrient additions. The increased food supply could result in higher survival of juvenile westslope cutthroat trout that rear in the mainstem Kootenai River. An increased food supply could also support faster growth rates leading to an earlier age at maturity, and improved condition (e.g., relative weight), resulting in higher fecundities.

3.1.5 Impacts of the No Action Alternative

No new impacts are expected. Current impacts to the Kootenai River ecosystem would continue or worsen. The biology of the Kootenai River system would likely not improve. The fishery would not improve without other projects or measures.

3.1.6 Cumulative Impacts

The equipment proposed is temporary and can be removed during the treatment season or later if treatment is discontinued. Treatment of the river could have positive cumulative effects if production <u>increases</u> up the food chain and more fish are available not only for humans but also for <u>other</u> animals <u>(insects, birds, and other terrestrial wildlife such as black bears)</u>. Treatment would be monitored so as to limit negative effects and if negative effects are created, treatment would be suspended. The land used for the equipment could revert to its previous condition when all equipment is removed.

As listed in Section 1.4, there are many projects and programs being implemented or planned for implementation whose goals are to enhance portions of the Kootenai River Basin. Those efforts, working in concert with this project and any future projects, could improve the condition of the Kootenai River ecosystem, which in turn would improve production and survival of many fish and wildlife species. Recovery and increased production in the ecosystem could result in more opportunities for fishing and hunting.

3.2 Land Use

3.2.1 Affected Environment

The proposed location for the treatment tanks is on private timber land. The private land is in young second growth timber, with scattered old growth. Lincoln County has no zoning in this area and there are no restrictions on land use on the private property (French, March 10, 2005).

The above ground, HMW pipes from the tanks would cross National Forest System Land that borders the private land. This area is in the Kootenai National Forest Plan as Management Area 13 (MA-13). This management area includes scattered parcels of

timber stands. The area proposed to be crossed by the treatment pipe is in second growth timber. The goal of this management area is "to provide special habitat necessary for old-growth dependent wildlife (usually other than big game) on a minimum of 10% of each major drainage on the Forest, and in units that represent the major habitat types and tree species of each drainage." Special uses are authorized on a case-by-case basis (USFS, 1987).

3.2.2 Potential Impacts of the Proposed Action

The treatment equipment proposed would be temporary. Some of the equipment would be removed after the end of the treatment season; others such as the tanks would be left on the site for the next treatment season. The land use would not be permanently changed except where trees are cut to make room for a gravel pad for the tanks and trailer. If treatment is suspended, the land could be recovered and planted with trees.

3.2.3 Potential Impacts of the No Action Alternative

No land use impacts are expected to occur.

3.2.4 Cumulative Impacts

All equipment proposed for the treatment site is temporary. Some would be removed after each treatment season; others are temporary facilities that could be removed at the end of the project. The land could revert to its former condition.

3.3 Visual Resources

3.3.1 Affected Environment

Visual quality objectives for this management area (MA-13) vary depending on the visual significance of the area. Because the area is next to the Kootenai River, and may be seen from the river, riverbanks and other vantage points, the visual quality objective (VQO) for the area where the pipes would cross has high visual quality and so should be managed to retain the visual quality.

The area is situated between mountains and attracts tourists and residents because of its scenic visual resources. From the valley floor the area provides vistas of snow-capped mountains. The nearby area is rural, with farmland and scattered houses on the valley floor and along the river, and forestland and rural residential sites in the foothills. The non-operational Leonia Bridge crosses the river just south of the treatment site. Along the west side of the river railroad tracks add an industrial element to the area. Trees, other vegetation, or topography screen most views of the treatment location.

The view of the treatment location and surrounding area from nearby hills and mountains is from a long distance and higher elevation.

3.3.2 Potential Impacts of the Proposed Action

Originally the tanks were proposed to be about 3.3 m high. After concerns expressed about whether the tanks could be seen from the river, the tanks were redesigned to be shorter (about 1.8 m) to minimize visibility from the river or from the steep slope. They

should not be visible from the river. The proposed tank site is not visible from Highway 2 or any existing homes. Tanks would be visible from the private property surrounding the site. The tanks would be covered or colored in a way to blend with the local vegetation. A chain-link fence with neutral-colored blinds would be placed around the tanks to reduce any attraction to the site from people recreating in or along the river.

The pipe, small wooden platform and PV panels down the slope may be visible from the river, but would likely be screened by trees or brush. The pipe would be semi-transparent and would blend into the native rock and vegetation on the riverbank. The treatment equipment proposed would be temporary. Some of the equipment such as the pipe in the river would be removed after the end of the treatment season; the tanks and the pipe on the steep slope would remain for the next treatment season.

The <u>wooden</u> control valve platform down the hillside toward the water would also have a fence around the equipment and would be mitigated and blended in by trees and smaller vegetation. The PV panels may be visible intermittently by visitors to the river. These panels must be on the slope facing the river for maximum sunlight to power the <u>instruments</u>. The visual resource of the area would not be permanently changed except where trees are cut to make room for a gravel pad for the tanks (on DLC Inc. property). If treatment is suspended, equipment would be removed and the land could be recovered and planted with trees.

3.3.3 Potential Impacts of the No Action Alternative

No visual impacts are expected to occur.

3.3.4 Cumulative Impacts

The area is regarded for its scenic qualities. All equipment proposed for the treatment site is temporary. Some would be removed after each treatment season; others are temporary facilities that could be removed at the end of the project. The land could revert to its former condition.

3.4 Recreation

3.4.1 Affected Environment

Northern Idaho and western Montana have many natural and manmade resources that provide residents and visitors with a choice of recreation opportunities. The landscape is varied and scenic. Rugged mountains, rivers and lakes draw visitors to this area. Activities include skiing, hunting, fishing, boating, hiking, golfing, and other outdoor sports. Deer, elk, bear and various birds and small animals are common in the area. The public land near the proposed treatment site is not fenced and may be used for informal, dispersed recreation including hunting, wildlife viewing, birdwatching, and walking. Boaters use the river for floating and fishing. No recreation facilities exist on the property.

3.4.2 Potential Impacts of the Proposed Action

The area of the river to be treated is used by boaters, hikers, birdwatchers, fishers and other recreationists. The pipe used for treatment would be submerged and would not provide a hazard to boaters.

If the treatment is successful and fish populations increase, there would be a benefit to fishers because there would be the opportunity for harvest. Hikers, birdwatchers and others could also benefit if birds and other predators increase.

3.4.3 Potential Impacts of the No Action Alternative

No impacts to recreation are expected.

3.4.4 Cumulative Impacts

There are varied and abundant recreation resources in the area and no formal recreation on the existing property. If the project is successful, additional recreation opportunities such as increased fishing could be available.

3.5 Water Resources

3.5.1 Affected Environment

No historical data (prior to 1950s) are available for baseline or "natural" ambient nutrient concentrations (P or N) in the Kootenai River. A phosphate fertilizer plant (Cominco, Ltd.) located on the Saint Mary River, a major tributary to the upper Kootenai River, (BC) was in operation from 1953 to 1987. The plant discharged more than 8,000 metric tons of phosphate annually into the river in the 1960s (Knudson 1993). This greatly increased measures of ambient total phosphorus (TP). By the time the plant was closed, Libby Dam had been on-line for over a decade, which reversed the problem from a nutrient surplus to nutrient deficiency, especially in the Idaho reaches of the Kootenai River (Hardy and Holderman, 2004).

The City of Bonners Ferry has an intake for its municipal water near rkm 247. The Kootenai River is a secondary source of drinking water for the City of Bonners Ferry, the primary source being Myrtle Creek. Other private properties draw water from the river for drinking or irrigation purposes.

3.5.2 Potential Impacts of the Proposed Action

The effective distance of the treatment would be from about the Montana border (rkm 276) downstream to Bonners Ferry (rkm 248; Ashley, July 21, 2004). Although the effective treatment distance is believed to end at about Bonners Ferry, effects downstream of that point may occur over time, especially in the upper meander reach, just downstream of Bonners Ferry. Effects may be seen as far as Kootenay Lake, B.C.. Because of this, regular trophic-level based monitoring would occur downstream of Bonners Ferry to Kootenay Lake by KTOI and IDFG. Additionally, a rigorous biological monitoring program exists on Kootenay Lake (B.C. Ministry of Environment), which would detect any changes in water chemistry and fisheries that may occur from treatment of the Kootenai River.

Water samples would be obtained weekly at pre-determined locations to monitor the desired nutrient concentrations. Comparisons of background water quality samples would be performed to determine the change in nutrient concentrations. As stated in Section 2.1.6, annual monitoring of the fish community (e.g., relative species abundance and CPUE) would allow the IKERT steering committee to either continue or halt the nutrient restoration program based on "negative threshold" values. Therefore, once these species increase to levels that may affect salmonid production (or other sensitive species such as Kootenai River white sturgeon), or the biomass proportion of salmonid:non-game fish becomes unacceptable (i.e., maximum negative target), the project would be reevaluated. By the very nature of ecosystem complexity, however, it is difficult to predict such outcomes. In the same likelihood of non-game fish species increasing, salmonid populations may increase to a level that creates a top-down control on these non-game fish communities. Careful evaluation of the trophic interactions within the 5-year experimental period should reveal if species shifts back to populations dominated by salmonids (Partridge 1983).

Management criteria of the nutrient additions have been set up to try and safeguard against any long-term deleterious effects of the treatments (see Section 2.1.6). In other words, should managers see nutrient additions resulting in potentially negative effects, the experiment would be discontinued and re-evaluated by the IKERT.

The City of Bonners Ferry has requested that total organic carbon (TOC), in addition to the six water quality parameters sampled at other sites, be measured weekly at the city water intake. Temperature (°C), conductivity (mS·cm), salinity (ppt), total dissolved solids, dissolved oxygen (mg·L and % saturation), standard pH, barometric pressure (mm·Hg), nitrate (mg·L N), and ammonia (mg·L N), and blue-green algae (V or cells·mL) would be measured at the city water intake, and reported to the appropriate agencies (Hoyle, 2005). Treatment dilutions are well within safe water consumption standards (human) within 2m of the pipe (human standards are more conservative than for aquatic organisms). During angler surveys performed during the treatment seasons, informational pamphlets about the project would be handed out. These pamphlets would also be available at boat launches and other areas used by recreationists and the general public. Signs would be placed near the outlet pipe to provide information and alert river users of elevated nitrate concentrations at the pipe nozzle prior to mixing (1-2 m; see Section 2.1.1 for more information on mixing zone concentrations).

Total Organic Carbon (TOC)

The City of Bonners Ferry is currently near the maximum level of TOC that they can safely chlorinate (2-2.5 mg/L). There should not be a measurable increase in TOC given the small amount of nutrients that would be added (Ashley, February 3, 2005). At most, the river would experience a slight increase in particulate organic carbon as some of the periphyton, such as algae, is scoured downstream in a flood event (for example) or in the fall when the periphyton dies off. If the nutrients are added in the proper ratios (approximately 20:1 for N:P), the river should experience little periphyton on the rocks, as it would be grazed and transferred into the invertebrate community (Ashley, February 3, 2005).

Northern rivers (e.g., the Mesilinka in northern B.C., treated for 4 years with nitrogen [15 μ g/L] and phosphorus [5 μ g/L]) experienced a lag of 1 year for the invertebrates to increase in density and biomass following the first treatment dates (Larkin, et al. 1997). Considering this, and the need for TOC increases to be minimal, managers on the Kootenai River are proposing to add the lower P load for 2005 (1.5 μ g/L), which would likely be increased to 3.0 μ g/L in 2006. This should allow the invertebrate community enough time to increase and to take advantage of the additional periphyton accrual.

Chlorophyll (CHL)

Department of Environmental Quality (DEQ) guidelines indicate that "surface waters of the state shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses..." (IDAPA 58.01.02-Water Quality Standards and Wastewater Treatment Requirements). Adding to this, Title 10-06 of DEQ surface water quality criteria states that "surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses" (IDAPA 58.01.02-Water Quality Standards and Wastewater Treatment Requirements). British Columbia (BC) has similar standards for surface water quality. For example, maximum chlorophyll a (CHL) concentration for aesthetic concerns are set at 50 mg/m², and the maximum without deleterious effects on stream life is set at 100 mg/m² CHL (Ashley and Stockner, 2003). In the upper Kootenai River (above Bonners Ferry) chlorophyll a concentrations in 1994 ranged from 46 mg/m² in July to 27 mg/m² in August (Snyder and Minshall, 1996). The same study showed that levels in 1995 were similar at 24 mg/m² in June and 39 mg/m² in July. Holderman and Hardy (2004), however, reported lower chlorophyll a concentrations (1-5 mg/m²) upstream of Bonners Ferry during the summers of 2001 and 2002. Although there are no specific CHL a criteria defined by Idaho DEQ for the Kootenai River, the objective is to stay within guidelines deemed acceptable in neighboring Canada. Objectives for CHL are to maintain Chlorophyll a concentrations below a maximum standard of 50-100 mg/m². Nutrient application to the Kootenai River would carefully follow water quality standards laid out by the Idaho DEQ and Environmental Protection Agency (EPA).

Metals

The objective is to maintain heavy metals additions at or below 1% of current background levels in the upper Kootenai River.

Since the phosphorus in the 10-34-0 nutrient solution is originally obtained through the mining of phosphate deposits around the earth, each ore body has its own unique amounts of heavy metals (Ashley and Stockner, 2003). Special attention would be paid to the origin of the phosphate in order to reduce heavy metal concentrations at the nutrient application site (only two major locations of mining of phosphorous exist in North America: Idaho and Florida). As a general rule, new metal additions should be maintained at or near 1% of current ambient metal concentrations to avoid harming aquatic organisms (Ashley, July 22, 2004).

Two 250 ml samples of the 10-34-0, the proposed form of nutrient additions, were sent to ALS Environmental (BC) for a full metals analysis in July 2004. Calculations performed by IDFG and KTOI in 2004 showed that following river mixing, the relative additions of metals to the river from the 10-34-0 are miniscule (< 0.1 µg/L; including such potentially harmful metals as arsenic, selenium, and mercury). Fish samples collected near the proposed treatment site were additionally sampled and analyzed in 2003 for background metals concentration. None of the fish tested (eight mountain whitefish and six large-scale suckers) were considerably high in metals concentrations (the analysis included such potentially harmful metals such as arsenic, selenium and mercury). The amount of metals that is to be added to the river is so small (< 0.1 µg/L) bioaccumulation of these metals in fish tissue would not likely be a factor (Ashley, July 22, 2004). Samples would be taken from approximately 25 fish annually to determine if the project is within the set guidelines. Substrate and water column samples would be taken weekly during the treatment application period.

There is likely only a minor, if any, hydrologic connection between the river water and some private wells in the Kootenai River Valley. Little or no impacts to local wells are expected because the treated river water should be filtered while traveling through the aquifer, and the river's organisms would use up the nutrients far in advance of the water being added to the local groundwater (Ashley, July 21, 2004). However, at the request of residents, some local wells would be sampled to see if any changes are detected after nutrients are added.

3.5.3 Potential Impacts of the No Action Alternative

No <u>new impacts</u> to water resources would occur. <u>Current impacts to the Kootenai</u> <u>River ecosystem would continue</u>. <u>The quality of the Kootenai River would remain as it is today, with reduced levels of nutrients.</u>

3.5.4 Cumulative Impacts

If treatment is successful in meeting the goals of the project and does not create negative impacts, the cumulative impacts would be beneficial to the ecosystem's animal communities and also to the human communities of tribes, fishers, and recreationists. If the treatment does not meet the goals, it would be suspended and there would be no cumulative impacts. The water quality of the river would be monitored to ensure that it is not degraded from the treatment and that it meets the requirements for municipal water withdrawals.

3.6 Wetlands

3.6.1 Affected Environment

Wetlands are areas of transition between aquatic and terrestrial systems, where water is the dominant factor determining the development of soil characteristics and associated biological communities. They are important communities that have declined over the years due to an increase in agriculture practices and urban development. Because of these losses, federal, state, and local laws protect wetlands. Jurisdictional wetlands, or wetlands that are regulated, are defined as "areas that are inundated or saturated by

surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (U.S. Army Corp of Engineers, 1987). Wetlands in the project area were identified using USFWS National Wetland Inventory Maps and aerial photos.

There is one riverine wetland along the eastern riverbank where the pipe would run into the river. This wetland is bounded by the riverbank. Riverine wetlands are those that occur within the river channel and are dominated by emergent vegetation that remains only through the growing season (American Wetlands Campaign, 2005).

3.6.2 Potential Impacts of the Proposed Action

No construction would occur in the wetland. The wetland mapped is along the river. The only action that would take place would be laying the pipe along the riverbank to the river. No soil or plants would be disturbed. No impacts are expected.

3.6.3 Potential Impacts of the No Action Alternative

No impacts to wetland resources would occur.

3.6.4 Cumulative Impacts

No cumulative impacts would occur.

3.7 Floodplains

3.7.1 Affected Environment and Potential Impacts

The floodplain of the river ends at the edge of the riverbank where the topography quickly gains elevation. The tank site is on a bench high above the river and is outside the floodplain of the river.

The pipe that crosses the riverbank then descends into the river would be in the floodplain for about 12 weeks. The schedule for treatment is during typical low flow times of the year (June-September) and the pipe would be removed from the river and riverbank at the end of the treatment. The pipe would be on the top of the ground, and the ground would not be disturbed.

No impacts to floodplains are expected.

Because the proposed treatment requires nutrients to be mixed into the river, there is no alternative to putting the equipment temporarily across the floodplain.

3.7.2 Potential Impacts of the No Action Alternative

No impacts to floodplain resources would occur.

3.7.3 Cumulative Impacts

No cumulative impacts would occur.

3.8 Cultural Resources

3.8.1 Affected Environment

This stretch of the Kootenai River is the traditional territory of the Bonners Ferry band of the Lower Kootenai, now the Kootenai Tribe of Idaho. It likely saw frequent use by other nearby Native American groups including other Kootenai bands and the Kalispell (Ives, 2005).

In September 1809, a North West Company exploratory party, led by David Thompson, descended the Kootenai River to present-day Bonners Ferry. However, Euro-American contact had been made earlier by a small number of explorers, missionaries and traders. Indirect influences such as trade goods, horses and diseases had already had a great impact on the traditional cultures of Native American groups within the region (Ives, 2005).

Interactions with Euro-Americans increased with the arrival of gold mining prospectors into the area in the 1890s. Wagon roads from Troy, Bonners Ferry and Leonia were constructed in the late 1890s in an attempt to control traffic to and from the mining claims. The town of Leonia, located just west of the project **Area of Potential Effects (APE)** on the Idaho side of the Kootenai River was a station supplying needs of local homesteaders and miners. Ferry service and later the Leonia Bridge, constructed in 1922, provided a way to connect travel across the river.

3.8.2 Potential Impacts of the Proposed Action

No cultural resources were identified during the field survey of the Area of Potential Effects conducted in March 2005. However, according to Montana State Historic Preservation Office site files, portions of the historic Moyie-Sylvanite and Leonia-Sylvanite wagon roads are located within the project APE. A portion of the historic Moyie-Sylvanite wagon road would be used to access the proposed storage tank location, and the outlet from the storage tanks would cross the path of the Leonia-Sylvanite wagon road (Ives 2005).

Project plans call for the portion of the Moyie-Sylvanite road to be improved for use as an access road by adding fill material. The road within the project area is on private land and has been impacted as a result of logging activities. Further modification in the form of adding fill material would not adversely affect this culture resource.

The portion of the Leonia-Sylvanite wagon road within the APE was constructed in 1896 and abandoned the following year. No evidence of this cultural resource was observed during the field survey.

BPA has consulted with the Montana State Historic Preservation Office. The Montana State Historic Preservation Office has concurred with BPA's determination that the project would have no adverse effect on historic properties.

In the unlikely event that archaeological material is encountered during the implementation of this project, an archaeologist would immediately be notified and work halted in the vicinity of the finds until the material can be inspected and assessed. The

Montana State Historic Preservation Office and the appropriate Tribes will be notified of any future findings.

3.8.3 Potential Impacts of the No Action Alternative

No impacts to cultural resources would occur.

3.8.4 Cumulative Impacts

The historic wagon roads in the area have been impacted in the past by logging and other human activities. The proposed project would use a portion of the Moyie-Sylvanite road for access to the treatment site and this road would be improved by adding fill material. Though no evidence of the Leonia-Sylvanite wagon road was found during a survey, it would be crossed by the treatment pipe.

3.9 Vegetation

3.9.1 Affected Environment

The proposed location for the treatment tanks is on private timber land. The private land is in young second growth timber, with scattered old growth.

The pipes from the tanks would cross National Forest System Land in the Kootenai National Forest. Most of the Kootenai National Forest is tree-covered. Trees native to the area include western red cedar, western hemlock, western white pine, lodgepole pine, ponderosa pine, Douglas-fir, subalpine fir, grand fir, whitebark pine, alpine larch, western larch, mountain hemlock, Engelmann spruce, and juniper. Of the over 2.2 million acres on the Kootenai National Forest, about 1.8 million acres are considered capable of producing commercial timber. Habitat types are primarily in the Douglas fir, hemlock, and alpine fir series with clintonia and snowberry union as the dominant understory. Ponderosa pine/bitterbrush is found in scattered areas. There are also small areas of ponderosa pine habitat type in the Tobacco Plains, the West Kootenai Bench, and on the dry south slopes in the drier sites and exposures. The Three Rivers and Yaak Ranger Districts commonly support cedar/clintonia and hemlock/clintonia habitat types. Hemlock/devil's club and cedar/lady fern are found in moist high water table bottoms on those Districts, and in the foothills of the Cabinet Mountains Wilderness. Alpine fir/beargrass and whortleberry on the drier high elevation sites (USFS 1987).

The proposed treatment site is on a bench above the Kootenai River in second growth timber on private land next to Kootenai National Forest Plan Management Area 13. The above ground, HWM pipe to the river from the tanks would be in MA-13. This parcel is mostly second growth timber, with scatterings of old growth timber. This management area is designated Old-Growth Timber and the goal of this management area is to provide the special habitat necessary for old-growth dependent wildlife. Existing timber on the affected National Forest System Land is comprised primarily of ponderosa pine and Douglas fir. The ground cover and lower understory is almost exclusively clintonia, snowberry, and ocean-spray. No trees would be removed on National Forest System Land.

Noxious Weeds

Spotted Knapweed, Orange hawkweed, rush skeleton weed, and toadflax are the noxious weed species of concern in western Lincoln County, Montana (Williams, February 28, 2005). A visual inspection for these species would be conducted prior to construction on the site and treatment of these species, if found, would occur at that time. After construction is finished at the tank site and the access road, monitoring and treatment of the above species needs to be performed. The County recommends inspecting the county road that accesses the site and treating and monitoring it if noxious weeds were present. The County recommends Tordon 22K as the best herbicide to treat the four species listed.

Threatened and Endangered Species

Ute Ladies' Tresses

Ute Ladies' Tresses is a perennial orchid with a flowering stem, 20-50 cm tall. The flowers are ivory-colored and arranged in a spike at the top of the stem. The plants generally bloom from late July through August. Plants occur largely along streams and rivers and their floodplains, wet meadows, and open seepy areas, between elevations of 1300-1600 m. Two other species of *Spiranthes* are known to occur in Idaho.

There exists no documentation of Ute Ladies Tresses in Boundary County, Idaho or Lincoln County, Montana (Arvidson, December 18, 2004; Mincemoyer, December 5, 2004). The only known plants in Idaho occur in Jefferson, Madison, Fremont and Bonneville counties in southeast Idaho, largely along the Snake River floodplain (Mosely, 2002). In Montana, plants exist mostly in the eastern part of the state, especially along the Yellowstone River. In addition, no suitable habitat is present at the treatment site.

3.9.2 Potential Impacts of the Proposed Action

The potential impacts to vegetation would be from clearing of trees <u>and low-growing vegetation</u> for the tanks and other equipment and improved access. The amount of <u>vegetation disturbed</u> would be minor. There is a risk of spreading noxious weeds to these areas. A survey of noxious weeds would be done as suggested by the County. There would be no effects on Ute Ladies' Tresses because none occur in the area. If treatment is suspended, the land could be restored and planted with trees.

3.9.3 Potential Impacts of the No Action Alternative

No impacts to vegetation are expected.

3.9.4 Cumulative Impacts

Long-term effects to the area would be minor. Few trees and other vegetation would be removed. The equipment is temporary, and the area used for a gravel pad could be restored and replanted if treatment is suspended.

3.10 Soils

3.10.1 Affected Environment

Soils in the area, for the most part, have been influenced by glaciation and typically have a low inherent fertility when compared, for example, to soils on the west coast. The land type of the proposed treatment site from the Soil Survey of the Kootenai National Forest Area, Montana and Idaho (1995), is described as containing very steep slopes with lots of rock outcrop. This is the soil type for the area on National Forest System Land where the pipes would be. Because of the steepness of the slope, there is a potential for soil erosion. The soil on the bench where the tanks and access road would be located is a mixture of glacial till, residual soil, and stream deposits, which is underlain by bedrock. The area where the tanks would be is stable (Kuennen, March 12, 2005.)

3.10.2 Potential Impacts of the Proposed Action

The Proposed Action could create impacts from construction and use of the land. Site development would require an improved road to the tank site, a disturbed area for where the tanks and camp trailer would be located, and a turn-around area for the nutrient trucks to exit following the tank refill. The site would require some tree and shrub clearing, soil excavation, and other construction surface and subsurface disturbance. Potential impacts include soil erosion and dust. Erosion control measures would reduce potential impacts. Upper pad erosion control measures would include concrete lock blocks to contain all fill placed for the tank pad. Any additional potential erosion would be mitigated for and reduced by the use of staked straw bails in potential problem areas. Erosion from traffic to the lower valve platform (about 10 m south of the tank site) would be minimal and would be reduced with the aid of staircase and a knotted rope to stabilize persons during trips to collect flow data from the platform and to check the condition of the pipe.

3.10.3 Potential Impacts of the No Action Alternative

No impacts are expected.

3.10.4 Cumulative Impacts

Potential development could create erosion on hill slopes, but adequate erosion control measures would prevent loss of topsoil. If treatment is suspended, the land could be restored and planted with trees.

3.11 Noise, Public Health and Safety

3.11.1 Affected Environment

The treatment site is on private property and lies between the highway and canyon rim where traffic and human presence already exist. Ambient noise levels include noise from truck traffic on the highway during many hours of the day. A railroad line runs along the opposite of the river from the treatment site, and train noise is frequent. See Section 3.1 for impacts to wildlife.

Though the access road to the treatment site is gated and crosses private property, some informal visitors do use the area. The area along the river is accessible by boat and by foot. The Forest Service is concerned about potential vandalism on the site (see Section 3.11.2).

3.11.2 Potential Impacts of the Proposed Action

The Proposed Action would create minor increases in noise and human disturbance associated with construction of the treatment site and delivery of nutrients and personnel in the area. Nutrient holding tanks would need to be replenished 2-4 times during the treatment period. Motorized vehicle use would be limited to project-authorized personnel only.

The tanks would be surrounded by a berm (concrete lock-blocks or sandbags) with a <u>felt matt and</u> thick plastic membrane to contain any leaks from the tanks. This would prevent the nutrients from being released and affecting any other ground. No major leaks should occur because an automated switch would shut off flow should nutrients stream faster than programmed (indicating a break in the line) and an alarm system would alert the technician on site. Should any minor leaks in the line reduce vegetation in the immediate vicinity (the opposite should occur), the forest botanist would be consulted for re-vegetation recommendations. Following the treatment season, the tanks would be emptied and the pipe in the river removed until the following season.

Treatment dilutions are well within safe water consumption standards (human) within 2m of the pipe (human standards are more conservative than for aquatic organisms). Because tanks are located on the rim away from the river's edge, and an emergency alarm and shut-off valves would be in place, no spills directly into the Kootenai River are anticipated.

A fence would surround the tank area and the gate on the fence would be locked when the tanks are not in use to keep anyone from tampering with the injection system. A technician would be onsite during the treatment season and would provide security against vandalism.

The end of the pipe in the river would be submerged so that boaters could safely pass the pipe. During angler surveys performed during the treatment seasons, informational pamphlets about the project would be handed out. These pamphlets would also be available at boat launches and other areas used by recreationists and the general public. Signs would be placed near the outlet pipe to provide information and alert river users of elevated nitrate concentrations at the pipe nozzle prior to mixing (1-2 m; see Section 2.1.1 for more information on mixing zone concentrations).

As stated in other sections of the document, mitigation to reduce potential harm and/or an attraction for vandalism are included in the proposed action:

- Using a color for the tanks so that they blend into the surrounding environment:
- Onsite personnel to provide security and monitor the system and the nutrient application and equipment;
- An alarm system and automatic shutoff to prevent leaks;

- A concrete or sand berm around the tanks and a <u>felt matt and plastic liner</u> underneath the tanks to capture any potential leaks;
- A locked gate on the access road to the site;
- Posting and handing out informational pamphlets in the area.

3.11.3 Potential Impacts of the No Action Alternative

No impacts are expected.

3.11.4 Cumulative Impacts

No cumulative impacts are expected. The equipment is temporary. Some would be removed at the end of each treatment season. If a leak or vandalism occurs, the containment of the nutrients would prevent any lasting impact to the surrounding area.